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PENSOFT

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On a new species of *Chinapotamon* Daiand Naiyanetr, 1994 and the first record of *Chinapotamon pusillum* (Song, 1984) and *Songpotamon malipoense* Shi, Pan & Sun, 2023 (Crustacea, Decapoda, Brachyura, Potamidae) from northern Vietnam

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Abstract

The presence of freshwater crabs of the genus *Chinapotamon* Dai & Naiyanetr, 1994 (Potamidae) in northern Vietnam was only recently established with the description of *C.* cf. *depressum* (Dai, Song, Li & Liang, 1980) from Cao Bang Province, and *C.* cf. *pusillum* (Song, 1984) and *C. insulare* Le, Dang & Do, 2024, from Quang Ninh Province (Le et al. 2024). Re-examination of the specimens referring to the first two species specimens in comparison with the holotypes and original descriptions of *C. depressum* and *C. pusillum*, revealed that *C.* cf. *depressum* represents a new species, herein named *C. halangense* **sp. nov.** While *C.*cf. *pusillum* is confirmed to be *C. pusillum*, a recorda that represents a range extension for the latter species. *Chinapotamon halangense* **sp. nov.**, can be distinguished from congeners by distinct carapace proportions and clear differences in male gonopod morphology. In addition, we report on the discovery of *Songpotamon malipoense* Shi, Pan & Sun, 2023, from Ha Giang Province in northern Vietnam. As a result of these recent discoveries, Vietnam's freshwater crab fauna now comprises 65 recognized species.

Key Words

Biodiversity, freshwater crab, Indochina, Potamiscinae, taxonomy

Introduction

A number of studies have suggested that the southern provinces of China (e.g., Yunnan and Guangxi) to be the centre of diversity for freshwater crabs belonging to the family Potamidae Ortmann, 1896 (Cumberlidge et al. 2011; Shih and Ng 2011; Pan et al. 2022b), of which, most are thought to be endemic to the respective province where the species was described. Recent freshwater crab surveys in northern Vietnam, immediately south of Yunnan and Guangxi provinces have discovered species and genera of potamids that are also found in China suggesting that the freshwater crab fauna in northern Vietnam and southern China share a close biogeographic relationship (Yeo and Ng 1998; Yeo and Naruse 2008; Do et al. 2016; Ng and Ngo 2023; Ng et al. 2023; Dang et al. 2024).

Until recently, the genus *Chinapotamon* Dai & Naiyanetr, 1994, was believed to be a Chinese endemic, with 10 known species from Guangdong, Guangxi, and Guizhou provinces in southern China: *C. depressum* (Dai, Song, Li & Liang, 1980) [type species]; *C. anglongense* Dai & Naiyanetr, 1994; *C. clarkei* Ng, 2017; *C. dashiwei* Ng, 2017; *C. glabrum* (Dai, Song, Li & Liang, 1980); *C. longlinense* Dai & Naiyanetr, 1994; *C. maolanense* Zou, Bai & Zhou, 2018; *C. pusillum* (Song,

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1984); and *C. xingrenense* Dai & Naiyanetr, 1994 (cf. Dai et al. 1980; Song 1984; Dai and Naiyanetr 1994; Dai 1999; Ng 2017; Zou et al. 2018). Le et al. (2024) first recorded the genus from Cao Bang and Quang Ninh provinces in northern Vietnam; describing one new species (*Chinapotamon insulare* Le, Dang & Do, 2024) and provisionally extending the distributions of two taxa (*C.* cf. *depressum* and *C.* cf. *pusillum*).

Re-examination of the *Chinapotamon* specimens provisionally identified as *C.depressum* and *C.pusillum* showed that the "*C.* cf. *depressum*" from Cao Bang province is a new species (described herein), while "*C.* cf. *pusillum*" from Quang Ninh province is shown to be *C. pusillum* sensu stricto.

In addition, the first author also collected several specimens of a small semi-terrestrial species of potamid freshwater crab from Ha Giang province, northern Vietnam, which after morphological examination, proved to be *Songpotamon malipoense* Shi, Pan & Sun, 2023. This genus, together with two other species (*S. dixuense* Naruse, Chia & Zhou, 2018, *S. funingense* Shi, Pan & Sun, 2023 [type species]) had previously only been recorded from Yunnan province, in China (see Shi et al. 2023). Here we describe the new species of *Chinapotamon* (*C. halangense* sp. nov.) and report two new country records (*C. pusillum* and *Songpotamon malipoense*). With these three additions, this work raises the total number of potamid species found in Vietnam to 65.

Materials and methods

Specimens of *Chinapotamon* and *Songpotamon* were hand collected from northern Vietnam,and subsequently preserved in 70–95% ethanol. The specimens were examined under a Nikon SMZ18 and Leica M80 stereomicroscope and photos of the male first and second gonopods were taken using a Leica M125C stereomicroscope. Photographs were taken using Nikon D5600 digital single-lens reflex or Nikon Z8 mirrorless camera. The drawings were done using camera lucida attachment mounted on the stereomicroscope before being processed with Adobe Photoshop CS5 and Adobe Illustrator CS2 graphics software. Materials examined are deposited at the Institute of Biology (IB), Vietnam Academy of Science and Technology (VAST); the Zoological Reference Collection (ZRC) of the Lee Kong Chian Natural History Museum, National University of Singapore; and the Chinese Academy of Sciences (CAS), Beijing, China.

The following abbreviations are used: CL = maximum carapace length; CW = maximum carapace width; G1 and G2 = male first and second gonopods, respectively. Measurements, in millimeters (mm), are of the carapace width (CW) by carapace length (CL), as well as the ratio of length/width of the second and fourth ambulatory leg segments. The terminology used here essentially follows that used by Ng (1988, 2017), Davie et al. (2015).

Systematics

Family Potamidae Ortmann, 1896
Genus *Chinapotamon* Dai & Naiyanetr, 1994

Chinapotamon halangense sp. nov.

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Figs 1–3

Chinapotamon cf. *depressum* – Le et al. 2024: 504–507, figs 2, 3, 10A.
(not *Tiwaripotamon depressum* Dai, Song, Li & Liang, 1980)

Material examined. ***Holotype*** • 1 male (34.9 × 26.8 mm) (IB-FC-CHx01), a small stream in Lung Roi, Coong Hoai Village, Duc Quang Commune, Ha Lang District, Cao Bang Province, Vietnam, 22°43'25.2"N, 106°40'29.3"E, 14 May 2019, Do et al. leg. ***Paratypes*** • 2 males (34.4 × 26.3 mm, 32.5 × 25.2 mm), 1 female (27.2 × 21.3 mm) (ZRC 2024.0312), same data as holotype • 1 male (31.5 × 24.8 mm), 1 female (33.9 × 26.6 mm) (IB-FC-CHx03), a small stream in Lung Roi, Coong Hoai Village, Duc Quang Commune, Ha Lang District, Cao Bang Province, Vietnam, 22°43'25.2"N, 106°40'29.3"E, 15 May 2019, Do et al. leg. • 1 male (31.1 × 24.9 mm), 1 female (27.8 × 21.8 mm) (IB-FC-CHx04) a small stream in Khau Noc, Coong Hoai Village, Duc Quang Commune, Ha Lang District, Cao Bang Province, Vietnam, 22°43'46.6"N, 106°40'09.3"E, 15 May 2019, Do et al. leg. • 1 male (27.9 × 21.5 mm), 1 female (33.8 × 26.2 mm) (IB-FC-CHx05), a small stream, Coong Hoai Village, Duc Quang Commune, Ha Lang District, Cao Bang Province, Vietnam, 22°42'45.8"N, 106°39'53.8"E, 15 May 2019, Do et al. leg.

Diagnosis. Carapace (Fig. 1A) slightly wider than long, subovate (average adult carapace width 27.2–34.9 mm); dorsal surface relatively smooth, gently convex, regions not distinct. Epigastric and postorbital cristae distinct, separated by shallow groove. External orbital tooth very low. Epibranchial tooth very low, small. Cleft between external orbital and epibranchial teeth deep. Anterolateral margin of carapace slightly convex, cristate, granular; posterior margin converging strongly towards posterior carapace margin. Exopod of third maxilliped reaching to 0.3 times length of merus with flagellum shorter than width of merus (Fig. 1D). Male major chela oblate wide gape when closed (Fig. 1E). Ambulatory legs relatively slender; length to width ratio of last ambulatory merus = 2.5 (Fig. 1A). Thoracic sternites 3 and 4 without trace of groove demarcating suture (Fig. 2A). Male telson relatively broad, lateral margins slightly convex (Fig. 2A). Subterminal article of male first gonopod slender, sinous, proximal half trapezoidal, slightly wider than distal half, gently tapering distally; terminal article slender, bent outwards at about 45° (Fig. 3).

Description of holotype. Carapace subovate, slightly wider than long, ratio CW:CL=1.3; dorsal surface smooth, finely pitted, gently convex transversely, convex antero-posteriorly, regions poorly defined (Fig. 1A).

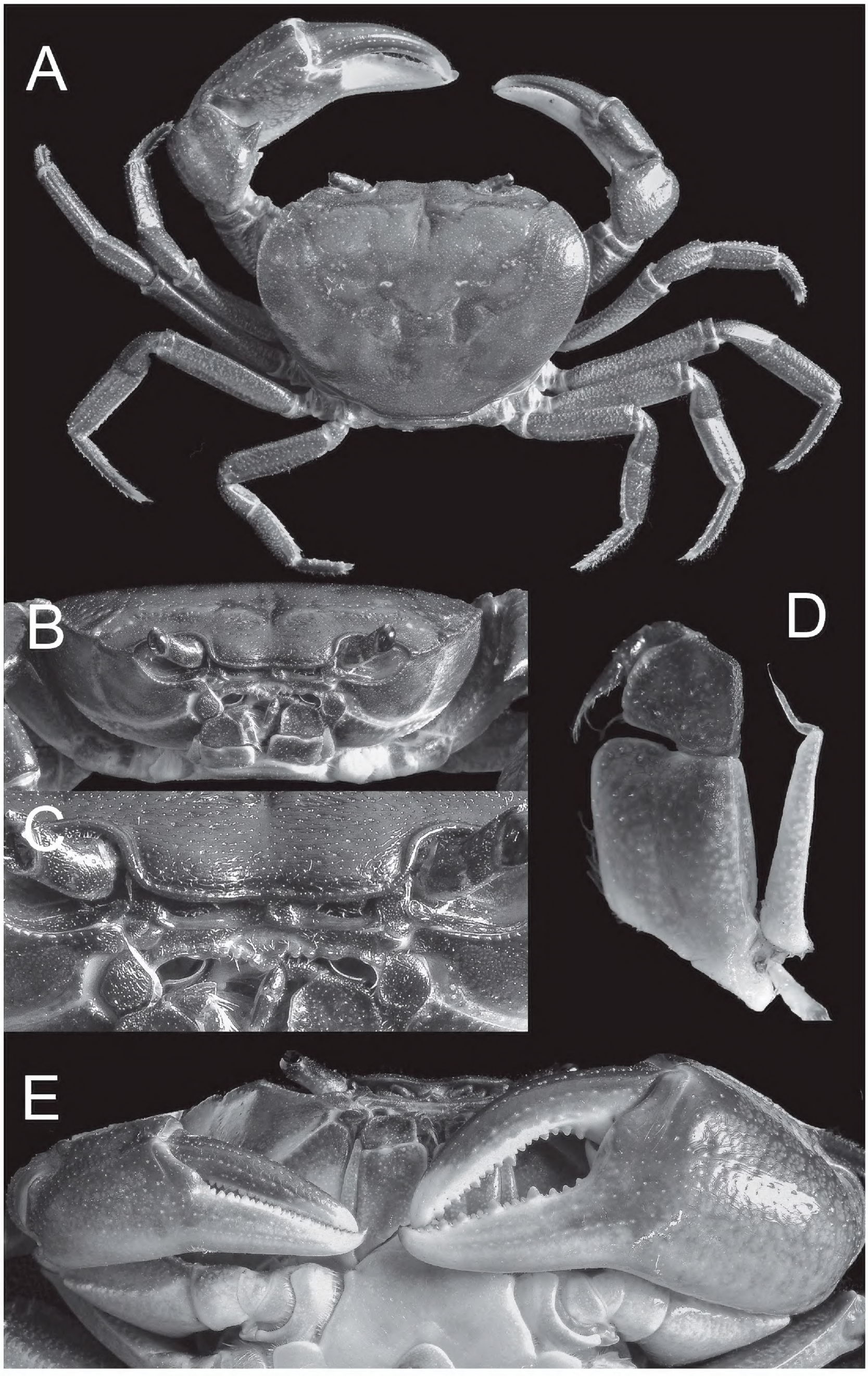

Figure 1. *Chinapotamon halangense* sp. nov. Holotype, male (34.9 × 26.8 mm) (IB-FC-HLx01). **A.** Overall dorsal habitus; **B.** Frontal view of cephalothorax; **C.** Antennae, antennule and epistome; **D.** Left third maxilliped; **E.** Chelipeds (lateral view).

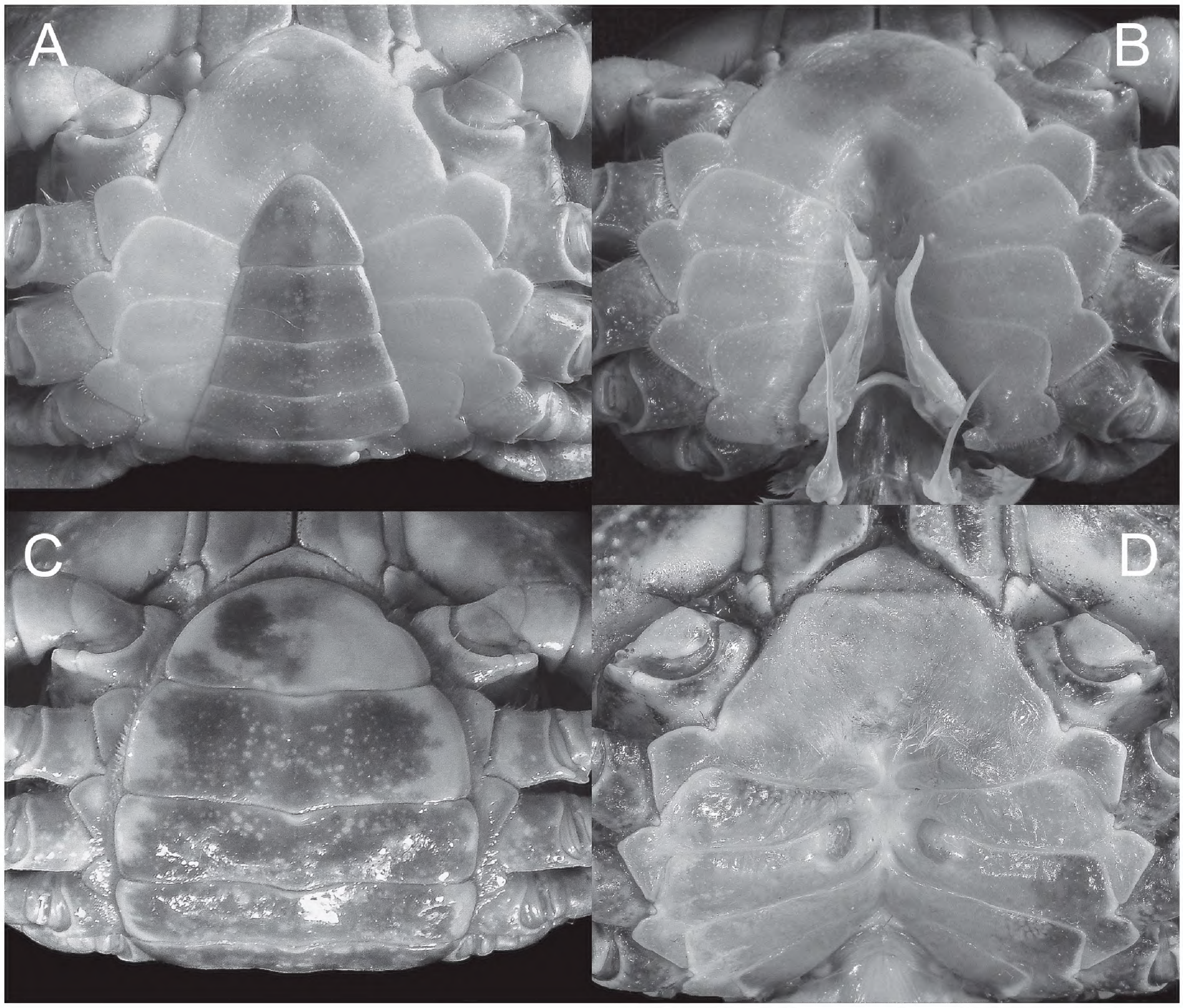

Figure 2. *Chinapotamon halangense* sp. nov. **A, B.** Holotype male (34.9 × 26.8 mm) (IB-FC-HLx01); **C.** Paratype female (33.9 × 26.6 mm) (IB-FC-HLx03); **D.** paratype female (33.8 × 26.2 mm) (IB-FC-HLx05). **A, C.** Ventral view, with pleon closed; **B.** Sternopleonal cavity with G1s and G2s in situ; **D.** Sternopleonal cavity and vulvae.

Frontal region smooth; lateral parts of anterolateral and branchial regions covered with short striae and small flattened granules; mesogastric, urogastric, cardiac and intestinal regions finely punctuated, otherwise smooth; orbital regions smooth; suborbital and pterygostomial regions uneven to almost smooth (Fig. 1A, B). Epigastric cristae distinct, not sharp, separated by broad, shallow Y-shaped furrow, separated from postorbital cristae by short, shallow groove; postorbital cristae low (Fig. 1A). Cervical grooves shallow but distinct; H-shaped median gastric groove shallow but distinct (Fig. 1A). Frontal margin divided into 2broad, low lobes, separated by broad, very shallow concavity; margin of each lobe gently convex, confluent with supraorbital margin (Fig. 1A). External orbital tooth very low, demarcated from rest of anterolateral margin by small, shallow notch, lined with very low granules; epibranchial tooth very low, small, barely discernible (Fig. 1A). Anterolateral margins distinctly cristate, lined with granules (Fig. 1A). Posterolateral margin strongly converging towards posterior carapace margin (Fig. 1A). Orbits subovate; eye filling orbit; ocular peduncle long; cornea normal (Fig. 1B). Supraorbital margin weakly concave, entire, lined with small, flattened granules (Fig. 1B). Suborbital margin concave, complete, lined with small granules (Fig. 1B). Posterior margin of epistome with distinct broad median triangle, each lateral margin with 2 lateral concavities (Fig. 1C).

Ischium of third maxilliped subrectangular, about 1.4 times longer than broad, smooth, with distinct median oblique groove; merus subquadrate, about 0.8 times as long as broad, surface smooth, anteroexternal angle broadly triangular, not expanded; exopod slender, reaching to 0.3 times length of merus, flagellum distinct, shorter than width of merus (Fig. 1D).

Male chelipeds asymmetrical in size (Fig. 1A, E). Anterior margin of basis-ischium almost smooth; inner-lower margins of merus granulated (Fig. 1E). Outer surface of carpus gently rugose, inner distal angle with distinct sharp tooth, with 2 smaller teeth basally (Fig. 1A). Outer surfaces of chelae with numerous pits, otherwise smooth;

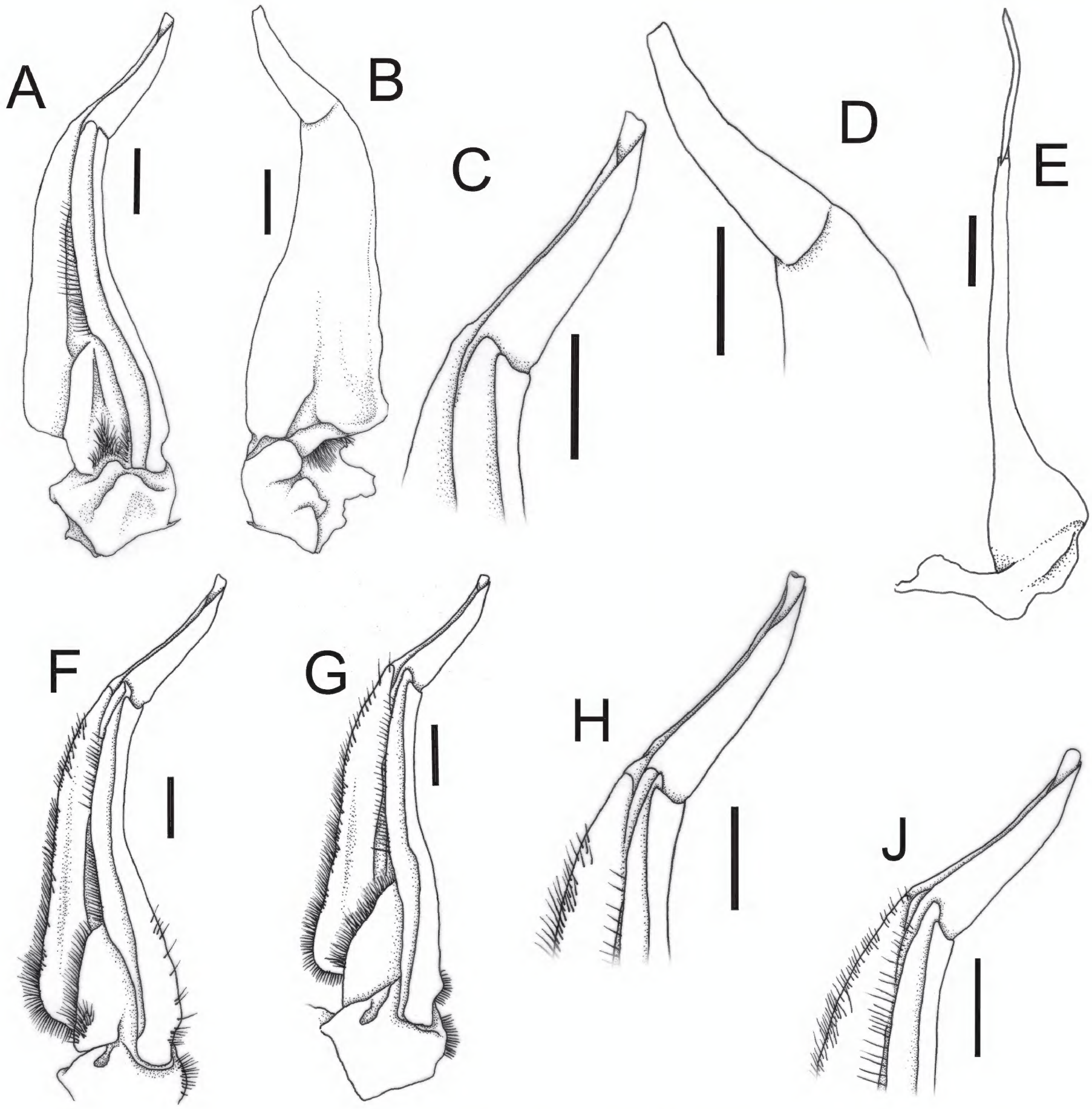

Figure 3. *Chinapotamon halangense* sp. nov., **A, B, F, G.** Left G1s; **E.** G2; **C, D, H, J.** G1 terminal articles. **A–E.** Holotype, male (34.9 × 26.8 mm) (IB-FC-HLx01); **F, H.** Paratype, male (34.4 × 26.3 mm) (ZRC 2024.0312); **G, J.** Male, (32.5 × 25.2 mm) (ZRC 2024.0312). **A, C, F, G, H, J.** Ventral view; **B, D.** Dorsal view. Scale bars: 1 mm.

chela palm in large males approximately 1.3 times as long as broad; major chela stouter, longer than minor chela (Fig. 1E). Fingers of major chela, stout, curved, shorter than palm, outer surface lined with 2 rows of pits; cutting edges of both fingers with stout teeth, forming slight gape when closed, with tips not crossing (Fig. 1E). Fingers of minor chela slender, shorter than major chela, fingers relative straight, with small gape when closed (Fig. 1E).

Ambulatory legs not elongated, slender; second pair longest, last pair shortest (Fig. 1A). Outer surface of merus slightly rugose, dorsal margin weakly serrated, length to width ratio of fourth merus = 3.4, and for propodus = 2.3; carpus slightly rugose, outer surface with submedian crista on first to third legs; propodus subrectangular, length to width ratio of fourth propodus = 2.3; dactylus gently curved, margins with short, sharp pectinate spines on both inner and outer margins (Fig. 1A).

Thoracic sternites relatively broad transversely (Fig. 2A). Sternites 1, 2 completely fused to form broadly triangular plate; separated from sternite 3 by complete suture; sternites 3, 4 completely fused, without a trace of groove demarcating suture; sternopleonal cavity reaching to imaginary line connecting bases of cheliped coxae (Fig. 2B). Male pleonal locking tubercle just aft of median part of sternite 5 (Fig. 2B). Male pleon triangular; telson relatively broad with lateral margins slightly convex, width to length ratio = 1.3; somite 6 broadly rectangular, width to length ratio = 1.9 (Fig. 2A).

G1 slender, reaching to suture between sternites 4 and 5 with terminal and subterminal articles clearly demarcated; subterminal articles relatively slender, sinuous, proximal half trapezoidal, slightly wider than distal half, tapering gently distally, directed inward proximally but outward distally, 2.6 times as long as terminal article; terminal article slender, relatively gradually tapering, bent at about 45° outwards, gently curving upwards, slightly upcurved distally, tip appears truncated with smaller protrusion, with groove for G2 visible in ventral orientation (Fig. 3). G2 longer than G1, distal article long, ratio of basal article to distal article = 2.6.

Females. Females are similar to male in most non-sexual features, chelipeds tend to be less asymmetrical. Female pleon ovate in mature individuals, covering thoracic sternites (Fig. 2C). Vulvae set relatively far apart, large, almost round; directed ventral-mesially, positioned on proximal half of sternite 6, pressing against suture with sternite 5 (Fig. 2D).

Colouration. Dorsal surfaces orangish-brown; ventral surface white; outer and inner surfaces of chelae light purple, inner surface very light purple (cf. Le et al. 2024: fig. 10A).

Etymology. The new species is named after the type locality, Ha Lang District.

Distribution. So far, this species has only been collected from Duc Quang Commune, Ha Lang District, Cao Bang Province, Vietnam. Its occurrence in small streams within well-vegetated and undisturbed forests suggests that it is possibly susceptible to anthropogenically-driven habitat disturbances.

Notes on ecology. The new species live in limestone mountain areas, in small springs, even in stagnant pools, often with decomposing leaves, branches and humus substrate (Fig. 4).

Remarks. *Chinapotamon halangense* sp. nov. can be distinguished from all other *Chinapotamon* species by the combination of the following characters: (1) medium sized species (CW of mature individuals range between 27.2–34.9 mm); (2) carapace subovate, dorsal surface convex, relatively smooth; (3) distinct epigastric and postfrontal cristae; (4) deep cleft between external orbital and epibranchial teeth; (5) anterolateral margins with distinct cristae; (6) anterolateral region gently rugose; (7) concavity between frontal margin lobes broad and shallow; (8) male major chela with oblate wide gap when closed; (9) ambulatory legs relatively slender; (10) sternites 3 and 4 completely fused, without a trace of groove demarcating suture; (11) subterminal article of male first gonopod is relatively slender, proximal half trapezoidal, distal half gently tapering distally; and (12) terminal article slender, bent outwards at about 25°, slightly upcurved distally.

Among described species of *Chinapotamon*, *C. depressum* (Dai, Song, Li & Liang, 1980) is morphologically closest to *C. halangense* sp. nov. In fact, *C. halangense* sp. nov. was previously referred to *C.* cf. *depressum* by Le et al., 2024, with references to the descriptions and illustrations by Dai and Naiyanetr (1994) and Dai (1999). The species shares affinities with *C. depressum* sensu stricto, in terms of medium adult carapace size, the relatively broad G1 subterminal article and the G1 terminal article being similarly bent outwards at about 25° (cf. Dai et al. 1980: fig. 3; Dai 1999: fig. 43). Recent photographs of the holotype specimen of *C. depressum* in CAS have, however, revealed some discrepancies in the G1 morphology, when compared to the illustrations in Dai et al. (1980) and Dai (1999). Upon close examination, the new species can be distinguished from *C. depressum* by the following consistent differences: (1) subovate and smooth carapace (Fig. 1A) (vs. carapace subquadrate and comparatively rugose, particularly around branchial regions, cf. Fig. 5A); (2) epigastric and postorbital cristae faint (Fig. 1A) (vs. well-developed epigastric and postorbital cristae, cf. Fig. 5); (3) external orbital tooth positioned lower than frontal margin (Fig. 1A) (vs. external orbital tooth positioned higher than frontal margin, cf. Fig. 5); (4) suture separating sternites 3 and 4 barely visible (Fig. 1A) (vs. suture separating sternites 3 and 4 prominent, cf. Fig. 5);

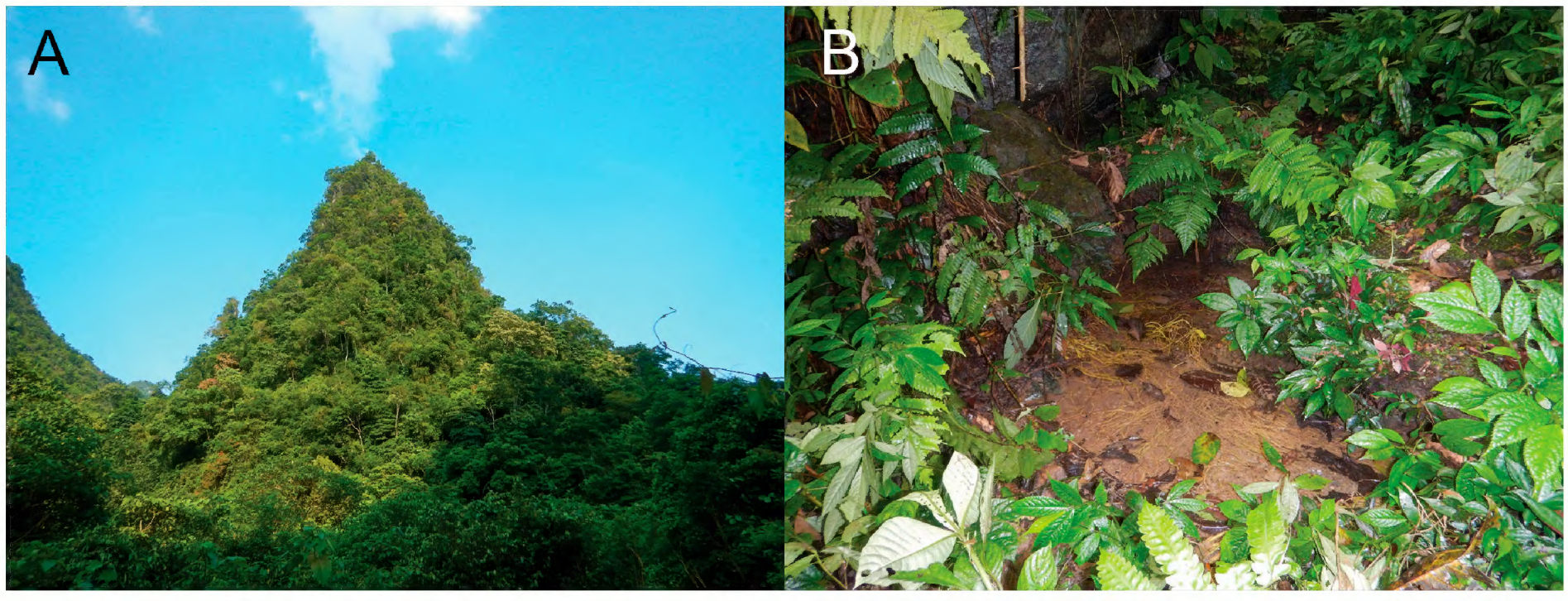

Figure 4. Habitat of *Chinapotamon halangense* sp. nov. **A.** Karst hill in Duc Quang Commune, Ha Lang District, Cao Bang Province; **B.** Shallow seepage and streams where *C. halangense* sp. nov. was collected from.

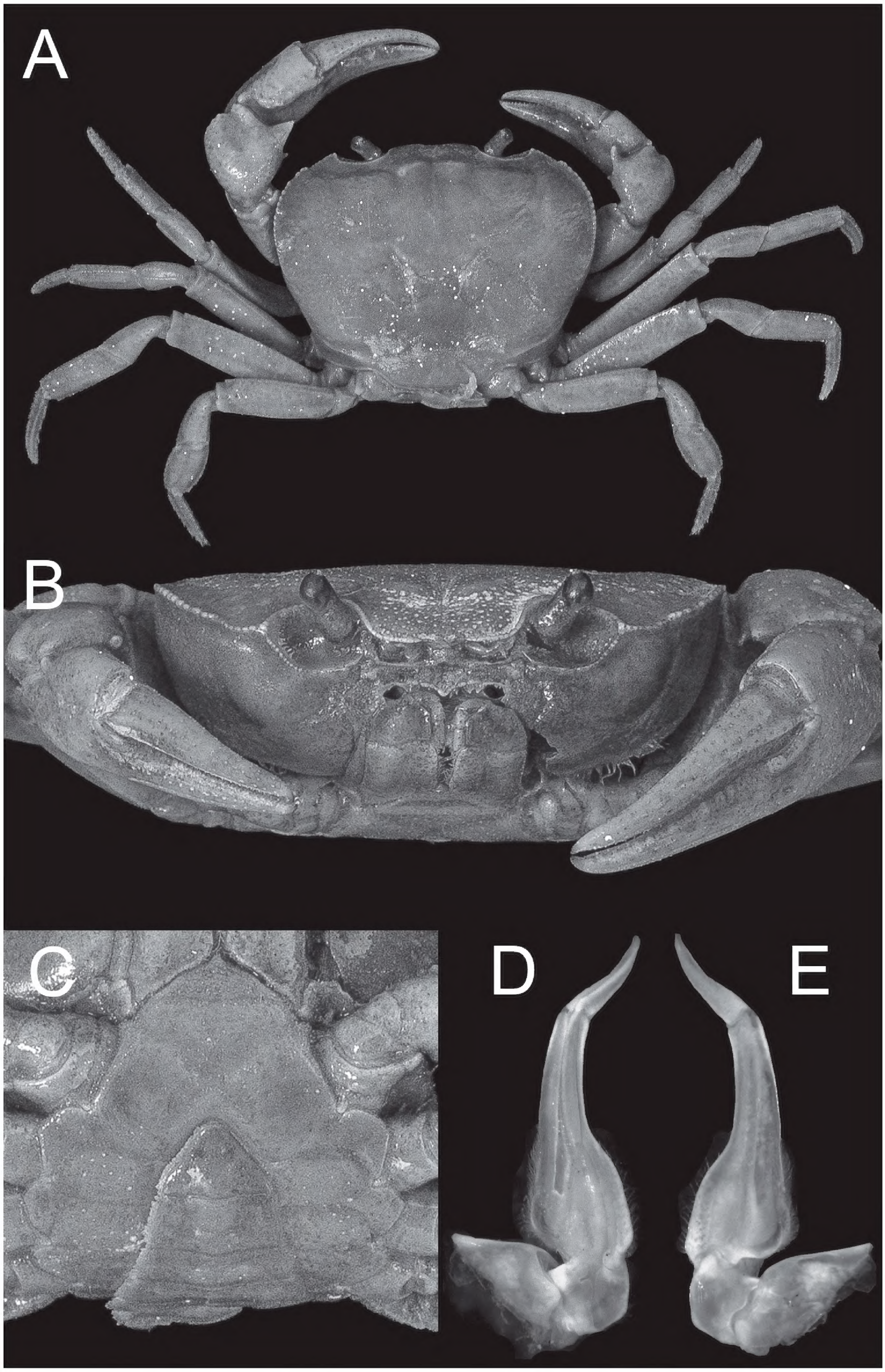

Figure 5. *Chinapotamon depressum* (Dai, Song, Li & Liang, 1980). Holotype male (CAS CB-05199). **A.** Overall dorsal habitus; **B.** Frontal view of cephalothorax; **C.** Ventral view; **D.** Left G1 (ventral view); **E.** Left G1 (dorsal view).

(5) ambulatory legs slenderer, merus and propodus of last ambulatory leg 3.5 and 2.3 times as long as wide respectively (Fig. 1A) (vs. ambulatory legs stouter, merus and propodus of last ambulatory 3.3 and 2.1 times as long as wide, respectively, cf. Fig. 5; Dai 1999; Ng 2017: table 1; Zou et al. 2018: table 2); (6) major chela fingers forming large ovate gape when closed (Fig. 1E) (vs. major chela fingers forming no gape when closed, cf. Fig. 5; Dai 1999: pl. 4, fig. 5; cf. Zou et al. 2018: table 2); (7) telson broadly triangular, lateral margins slightly convex (Fig. 2A) (vs. telson acutely triangular, lateral margins straight, cf. Fig. 5); and (8) G1 subterminal article basal part proportionally longer, with shorter, broader neck-like distal half (Fig. 3) (vs. G1 subterminal article basal part proportionally shorter, to proximal third of article, with longer, more slender distal neck-like part, cf. Fig. 5D, E).

Chinapotamon pusillum (Song, 1984)

Figs 6–8, 10

Tiwaripotamon pusillum Song, 1984: 143–145, figs 1–9

Chinapotamon pusillum Dai & Naiyanetr, 1995: 63, fig. 10; Dai, 1999: 91–92, fig. 42; Ng et al. 2008: 161; Cumberlidge et al. 2009: table A1.

Chinapotamon cf. *pusillum* Le et al. 2024: 507–509, figs 4, 5, 10B.

Material examined. ***Holotype*** • 1 male (CAS CB-05188). ***Others*** • 1 male (15.9 × 14.2 mm) (IB-FC-CMx01), a small stream flowing into the rice canal, in Song Mooc village, Dong Van Commune, Binh Lieu District, Quang Ninh Province, 21°33'11.5"N, 107°34'21.2"E, 22 March 2023, Do Van Tu leg. • 6 males (14.2 × 12.3 mm, 12.3 × 10.9 mm,12.2 × 11.4 mm, 11.7 × 10.4 mm, 11.2 × 10.1 mm, 11.0 × 9.8 mm), 6 female (21.0 ×18.0 mm, 20.0 × 16.5 mm,17.8 × 15.1 mm, 17.3 × 14.0 mm, 13.7 × 11.7 mm, 12.4 ×10.8 mm) (IB-FC-CMx02), same data as above • 2 males (17.0 × 14.3 mm, 14.8 × 13.9 mm), 1 female (21.2 × 17.3 mm) (ZRC2024.0313), same data as above.

Diagnosis. Diminutive species (adult carapace width range between 14.0–21.0 mm). Carapace slightly wider than long, subquadrate, rugose, gently convex, region not distinct, indistinctly separated (Fig. 6A). Epigastric and postfrontal cristae distinct (Fig. 6A). External orbital and epibranchial teeth low; cleft between external orbital and epibranchial teeth deep (Fig. 6A). Anterolateral margin of carapace slightly convex, cristate (Fig. 6A). Exopod of third maxilliped reaching to 0.2 times length of merus with flagellum longer than width of merus (Fig. 6). Male major chela no gape when closed (Fig. 6E). Ambulatory legs not elongated (Fig. 6A). Sternites 3 and 4 without trace of groove demarcating suture (Fig. 7A). Male telson relatively broad, lateral margins almost straight (Fig. 7A). G1 slender, sinuous, terminal article bent about 25° outward proximally, recurved distally, tip directed vertically (Fig. 8).

Description of Vietnamese specimens. Carapace subquadrate, slightly wider than long, CW:CL ratio = 1.1 (median = 1.1); dorsal surface rugose, finely pitted, gently convex transversely, gently convex antero-posteriorly, regions poorly defined (Fig. 6A). Frontal region rugose; lateral parts of anterolateral, hepatic and branchial regions rugose; protogastric, mesogastric, urogastric, cardiac and intestinal regions almost smooth except for pits; orbital regions slightly rugose; suborbital and pterygostomial regions rugose (Fig. 6A, B). Epigastric cristae low, distinct, not sharp, separated by broad, shallow Y-shaped furrow, confluent with postorbital cristae; postorbital cristae low (Fig. 6A). Cervical grooves shallow, indistinct; H-shaped median gastric groove shallow but distinct (Fig. 6A). Frontal margin divided into two broad, low lobes, separated by broad, shallow concavity; margin of each lobe gently convex, confluent with supraorbital margin (Fig. 6A). External orbital tooth low, demarcated from rest of anterolateral margin by small, shallow notch; epibranchial tooth low (Fig. 6A). Anterolateral margins distinctly cristate, lined with small granules (Fig. 6A). Posterolateral margin gently converging towards posterior carapace margin (Fig. 6A). Orbits subovate; eye filling orbit; ocular peduncle long; cornea normal (Fig. 6B). Supraorbital margin weakly concave, entire, lined with small, flattened granules (Fig. 6 B). Suborbital margin concave, complete, lined with small granules (Fig. 6B). Posterior margin of epistome with distinct broad median triangle, each lateral margin with 2 lateral concavities (Fig. 6C).

Ischium of third maxilliped subrectangular, about 1.5 times longer than broad, smooth, with distinct median oblique groove; merus subquadrate, about 0.8 times as long as broad, surface smooth, anteroexternal angle broadly triangular, not expanded; exopodslender, reaching to 0.2 times length of merus, flagellum distinct, longer than width of merus (Fig. 6D).

Chelipeds slightly asymmetrical, relatively stout, no significant difference in asymmetry between males and females (Fig. 6E). Anterior margin of basis-ischium almost smooth; inner-lower margins of merus granulated (Fig. 6E). Outer surface of carpus gently rugose, inner distal angle with distinct sharp tooth, with 2 smaller teeth basally (Fig. 6A). Outer surfaces of chelae smooth; chela palm in large males approximately 1.3 times as long as broad; major chela stouter, longer than minor chela (Fig. 6E). Fingers of major chela, stout, curved, shorter than palm, outer surface lined with 2 rows of pits; cutting edges of both fingers with stout teeth, very small gape when closed, tips slightly cross (Fig. 6E). Fingers of minor chela slender, fingers relative straight, almost no gap when closed (Fig. 6E).

Ambulatory legs not elongated; second pair longest, last pair shortest (Fig. 6A). Outer surface of merus slightly rugose, dorsal margin weakly serrated, length to width ratio of fourth merus = 3.0; carpus slightly rugose, outer surface with submedian crista on first to third legs; propodus subrectangular; length to width ratio of fourth propodus = 1.5; dactylus gently curved, margins with short, sharp pectinate spines on both inner and outer margins (Fig. 6A).

Thoracic sternites relatively broad transversely (Fig. 7A). Sternites 1, 2 completely fused to form broadly triangular plate; separated from sternite 3 by complete suture;

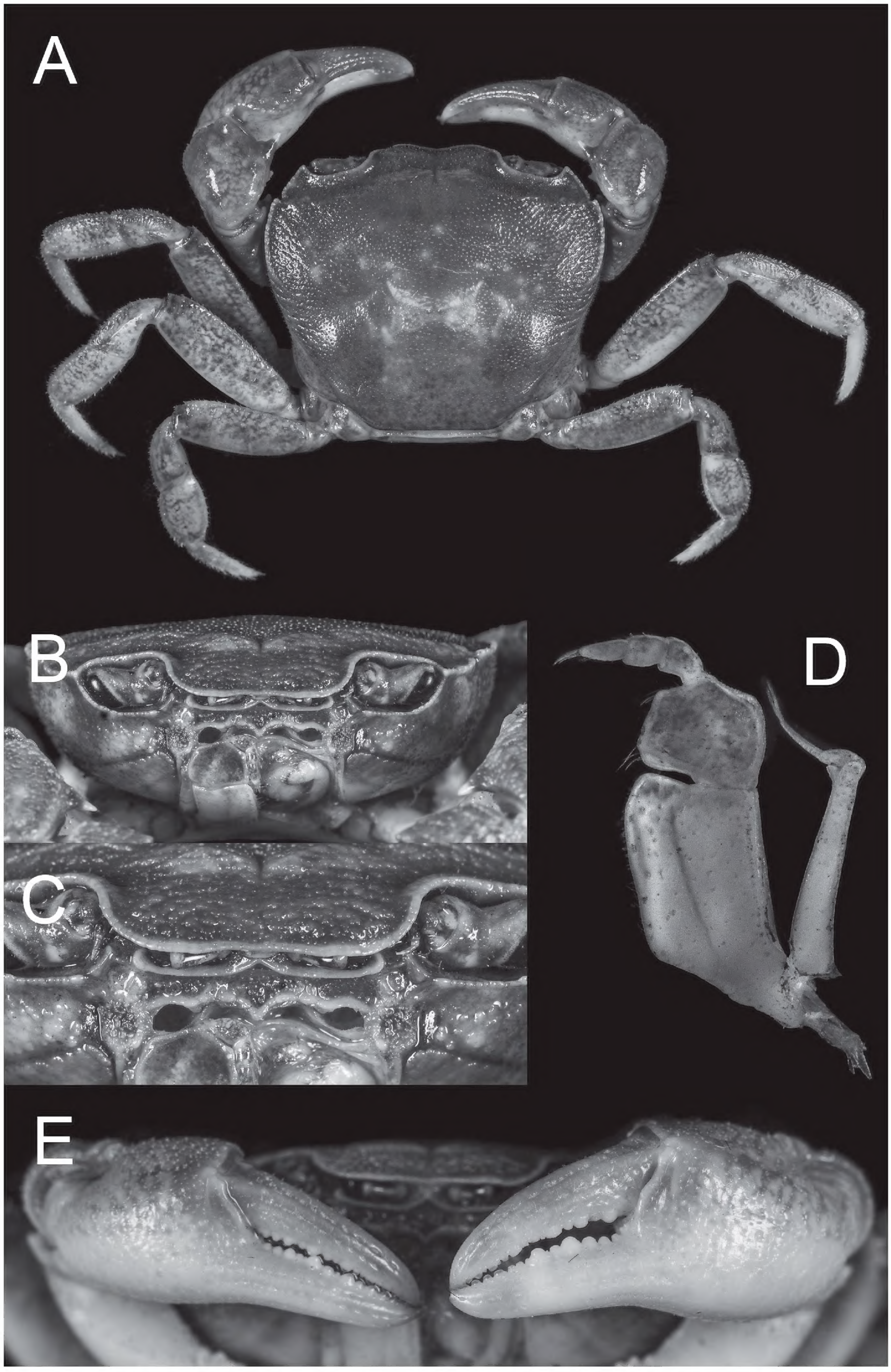

Figure 6. *Chinapotamon pusillum* (Song, 1984), Vietnam. Male (17.0 × 14.3 mm) (ZRC2024.0313). **A.** Overall dorsal habitus; **B.** Frontal view of cephalothorax; **C.** Antennae, antennule and epistome; **D.** Left third maxilliped; **E.** Chelipeds (lateral view).

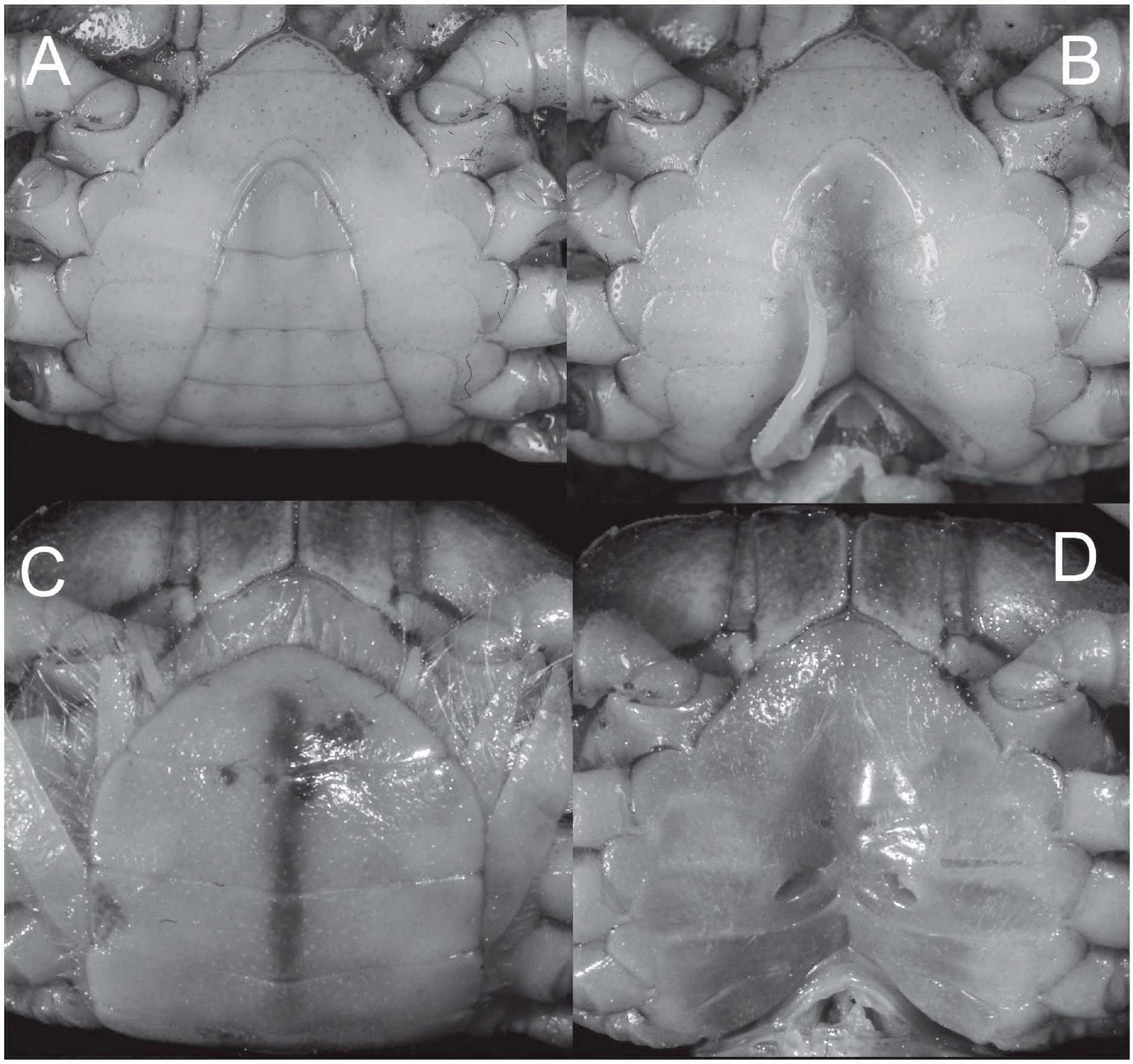

Figure 7. *Chinapotamon pusillum* (Song, 1984), Vietnam. **A, B.** Male (17.0 × 14.3 mm) (ZRC2024.0313); **C, D.** Paratype female (21.0 × 18 mm) (IB-FC-CMx02). **A, C.** Ventral view, withpleon closed; **B.** Sternopleonal cavity with right G1 in situ; **D.** Sternopleonal cavity and vulvae.

sternites 3, 4 completely fused, without suture; sternopleonal cavity reaching to imaginary line connecting bases of cheliped coxae (Fig. 7B). Male pleonal locking tubercle at median part of sternite 5. Male pleon triangular; telson relatively broad with lateral margins almost straight, width to length ratio = 1.3; somite 6 broadly rectangular, width to length ratio = 2.4 (Fig. 7A).

G1 slender, reaching to suture between sternites 4 and 5 with terminal and subterminal articles clearly demarcated; subterminal articles relatively slender, sinuous, proximal half sub-trapezoidal, wider than distal half, tapering gently distally, directed inward proximally but outward distally, 2.1 times as long as terminal article; terminal article slender, relatively gradually tapering, bent about 25° outward, tip not pointed, with groove for G2 visible in ventral orientation (Fig. 8). G2 slightly longer than G1, distal article long, ratio of basal article to distal article = 2.1.

Females. Female specimens similar to male in most non-sexual features. Female pleon ovate in mature individuals, covering thoracic sternites (Fig. 7C). Vulvae set relatively far apart, small, subovate; directed ventral-mesially, positioned on proximal half of sternite 6 (Fig. 7D).

Colouration. Dorsal surfaces brown; ventral surface white; outer and inner surfaces of chelae light yellow (cf. Le et al. 2024: fig. 10B).

Distribution. This species is currently known from Dong Van Commune, Binh Lieu District, Quang Ninh Province, Vietnam and Fangcheng District, Guangxi Province, China.

Notes on ecology. This species inhabits small streams and crevices with stagnant or slow-flowing water, where the banks are densely vegetated with shrubs and the substrate is rich in organic detritus (Fig. 9). Juveniles of *Indochinamon* spp. were also observed in the same habitat.

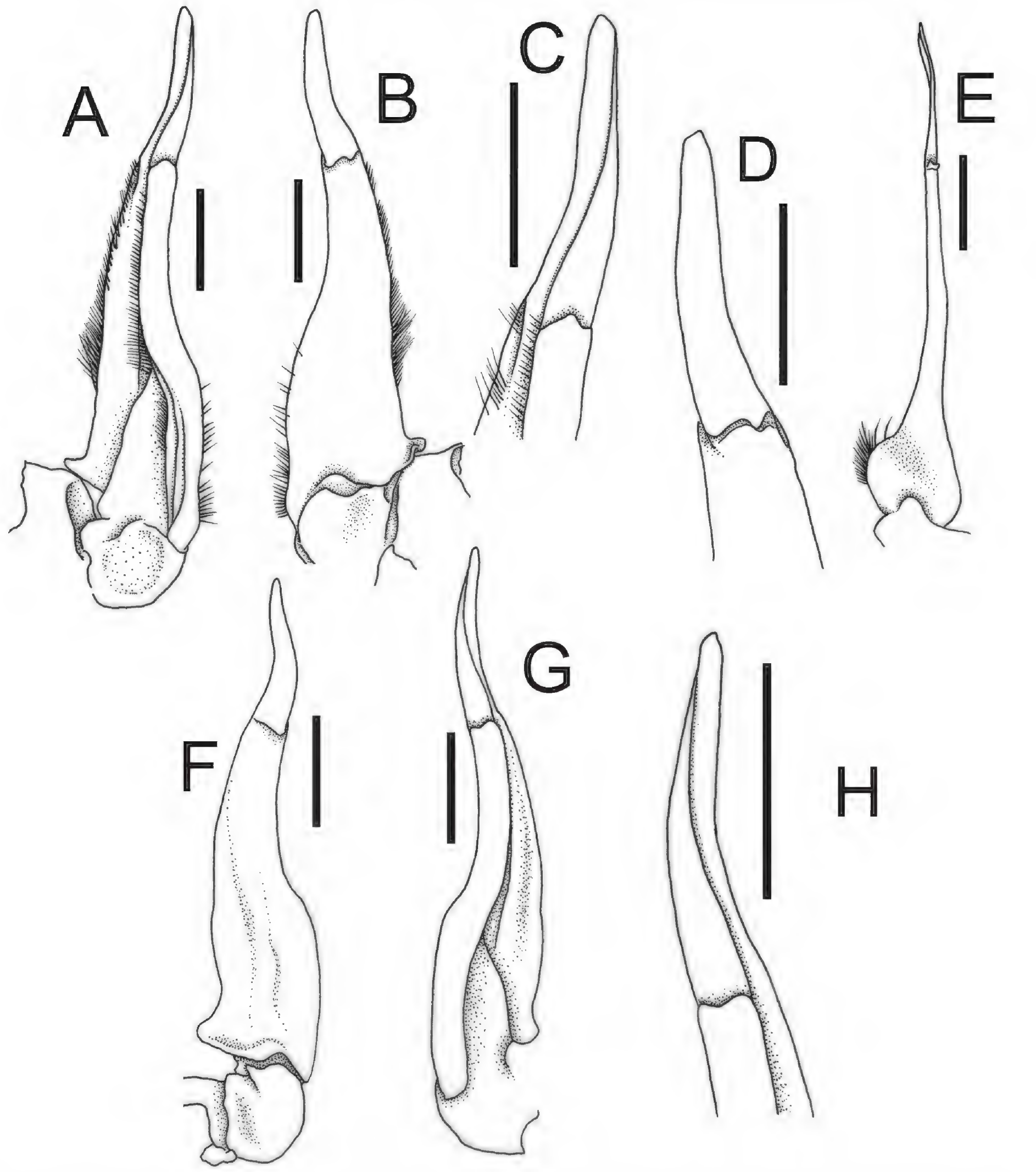

Figure 8. *Chinapotamon pusillum* (Song, 1984), Vietnam, G1s and G2. **A–E.** Male (17.0 × 14.3 mm) (ZRC2024.0313), **F–H.** Male (15.9 × 14.2 mm) (IB-FC-CMx01). **A, B, F, G.** G1s; **C, D, H.** G1 terminal articles; **E.** G2. **A, C, G, H.** Ventral view; **B, D, F.** Dorsal view. Scale bars: 1 mm.

Remarks. The discovery of *Chinapotamon pusillum* (Song, 1984), in northern Vietnam may not come as a surprise, especially considering the similar geography of the area, with China. The Vietnamese specimens were collected from Dong Van Commune, Binh Lieu District, Quang Ninh Province, Vietnam, an area directly bordering Fangcheng District, Guangxi Province, southern China, which is the type locality of *C. pusillum* (Fig. 15). The two areas are part of a contiguous mountain range known as Shiwan Mountain (Hu et al. 2023); it is very possible that the species is distributed throughout the range.

Differences between *C. pusillum* (Song, 1984) and its closest congener, *C. insulare*, have been discussed in detail in Le et al. (2024). However, Le et al. (2024) treated specimens from Vietnam as *C.* cf. *pusillum* because they noted that they differed from the type description and figures in possessing more distinct anterolateral crista and a longer G1 terminal article that reaches to beyond the suture between

Figure 9. Habitat of *Chinapotamon pusillum* (Song, 1984) in Vietnam, small stream flowing into the rice canal, Ban Song Mooc village, Dong Van Commune, Binh Lieu District, Quang Ninh Province.

thoracic sternites 4 and 5. We obtained fresh photographs of the holotype of *C. pusillum* (Fig. 10) and we can now confirm that there are no obvious differences in the strength of the anterolateral cristae (Fig. 6A). The difference noted in how far the G1 terminal article reaches beyond the suture between thoracic sternites 4 and 5 (Fig. 7B) can be affected by how much the male pleon is opened and flexed as well as the state of preservation of the specimens. Unfortunately, this is not apparent from the recent photographs of the holotype male. As such, we can only rely on the figure of this condition in Dai (1999: fig. 42.4) which may not have been drawn accurately. Nevertheless, on the basis of the available morphological characters and close geographical proximity, we are now confident they are actually conspecific with *C. pusillum* (Song, 1984) s. str. (Figs 6–8, 10, 15).

Morphologically, *C. pusillum* (Song, 1984) and *C. insulare* Le, Dang & Do, 2024, are quite distinct compared to congeners. These two species have a carapace that is more subquadrate and G1 terminal articles are directed more vertically, whereas in *C. depressum* (Dai, Song, Li & Liang, 1980), *C. anglongense* Dai & Naiyanetr, 1994, *C. clarkei* Ng, 2017, *C. dashiwei* Ng, 2017, *C. glabrum* (Dai, Song, Li & Liang, 1980), *C. halangense* sp. nov., *C. longlinense* Dai & Naiyanetr, 1994, *C. maolanense* Zou, Bai & Zhou, 2018 and *C. xingrenense* Dai & Naiyanetr, 1994, the carapace is more transversely subovate and the G1 terminal article is distinctively bent outwards (Figs 1, 5, 6, 10; cf. Ng 2017: figs 2, 6, 8; Zou et al. 2018: fig. 7, table 2). For now, *C. pusillum* and *C. insulare* will be retained in the genus *Chinapotamon* until the genus can be revised.

Genus *Songpotamon* Shi, Pan & Sun, 2023

Songpotamon malipoense Shi, Pan & Sun, 2023

Figs 11–14

Songpotamon malipoense Shi, Pan & Sun, 2023: 29–32, figs 8, 9D–F, 10C–D.

Material examined. • 5 males (16.5 × 13.1, 17.0 × 13.8, 18.8 × 14.7, 18.9 × 14.7, 21.0 × 16.2 mm), 7 females (15.0 × 12.3, 15.3 × 12.4, 17.0 × 13.8, 17.8 × 14.3, 18.1 × 14.5, 18.9 × 14.7, 19.0 × 15.5 mm) (IB-FC-SMx01), a small stream in Khau Vai, Khau Vai Commune, Meo Vac County, Ha Giang Province, Vietnam, 23°4'55.3920"N, 105°29'34.4639"E, 22 Mar 2024, Do et al. leg. • 2 males (21.8 × 16.3 mm; 19.4 × 15.3 mm), 1 female (18.8 × 14.6 mm) (ZRC 2024.0321), same data as above.

Description. None (see Shi et al. 2023 for full description).

Distribution. This species has only been found in karst landscapes between Vietnam and China, namely, Malipo County, Wenshan Prefecture, Yunnan Province, southwest China, and Khau Vai Commune, Meo Vac District, Ha Giang Province, northern Vietnam.

Ecology. This species was found in mud burrows on the banks of small hill streams (Fig. 11B). Field observations agree well with Shi et al.'s (2023) account of their material from Yunnan province, China; the present specimens collected from Ha Giang province, Vietnam, also exhibit a semi-terrestrial lifestyle.

Colouration. The dorsal surface of the carapace is dark brown, brighter on the ventral surface, and orange on the chelae (Fig. 11A; cf. Shi et al. 2023: fig. 7A).

Remarks. The examined specimens agree well with *Songpotamon malipoense* (see Shi et al. 2023). The specimens collected from Vietnam, like those from China are characterized by the following traits: relatively small adult carapace size (15.3–21 mm, n = 14); carapace broader than long, ovate; dorsal surface convex, smooth, pitted, regions not well defined; branchial regions swollen, smooth (Fig. 12A; cf. Shi et al. 2023: fig. 7A); postorbital and epigastric cristae inconspicuous, not confluent, separated by shallow groove; epigastric cristae weakly developed, oblique, separated by deep inverted Y-shaped groove; postorbital cristae low, weakly rugose (Fig. 12A; cf. Shi et al. 2023: fig. 7A); external orbital tooth bluntly triangular, outer margin convex, separated from anterolateral margin of carapace by shallow cleft (Fig. 12A; cf. Shi et al. 2023: fig. 7A); anterolateral margin of carapace convex, cristate, granular; posterolateral margin straight, with multiple weakly oblique striae (Fig. 12A; cf. Shi et al. 2023: fig. 7A); orbits large; suborbital regions smooth sub-hepatic and pterygostomial regions with small, rounded granules (Fig. 12B; cf. Shi et al. 2023: fig. 7B); median lobe of epistome posterior margin broadly triangular (Fig. 12C; cf. Shi et al. 2023: fig. 7B); exopod of third maxilliped without flagellum (Fig. 12D; cf. Shi et al. 2023: fig. 8C); chelipeds unequal in males (Fig. 12A; cf. Shi et al. 2023: fig. 7A); thoracic sternites 3, 4 in male fused except for relatively shallow, incomplete groove demarcating suture (Fig. 13A; cf. Shi et al. 2023: fig. 7C); male pleon narrowly triangular; somite 6 relatively narrow, width to length ratio 2.0 (Fig. 13A; cf. Shi et al. 2023: fig. 8E); G1 slender, reaching beyond pleonal locking tubercle up to suture between thoracic sternites 4 and 5 (Fig. 13B; cf. Shi et al. 2023: fig. 8G); subterminal article relatively slender, gently sinuous, inner margin almost straight;

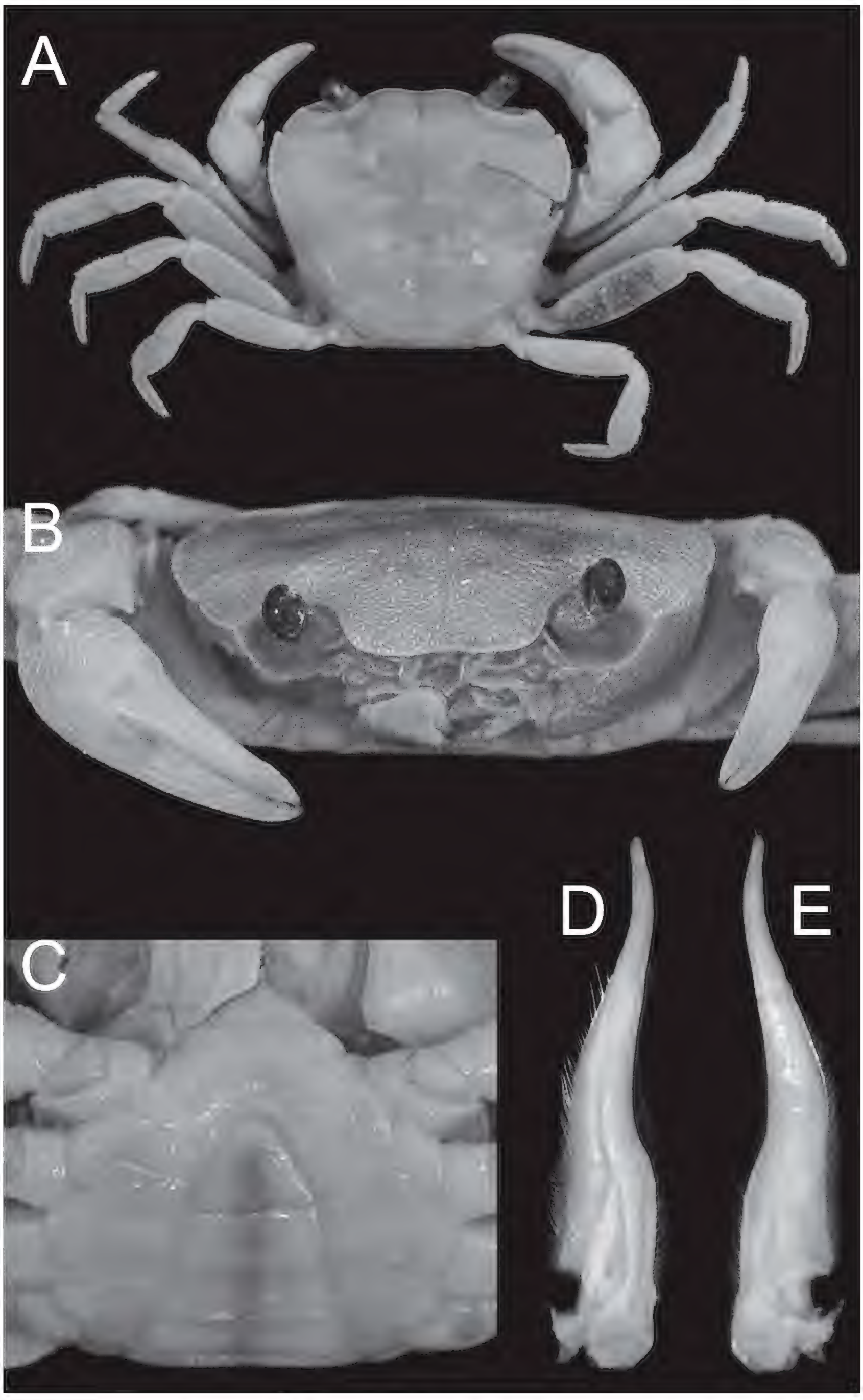

Figure 10. *Chinapotamon pusillum* (Song, 1984), holotype, male (CAS CB-05188). **A.** Overall dorsal habitus; **B.** Frontal view of cephalothorax; **C.** Ventral view; **D.** Left G1 (ventral view); **E.** Left G1 (dorsal view).

Figure 11. *Songpotamon malipoense* Shi, Pan & Sun, 2023 in situ, Vietnam. **A.** Live colouration of *Songpotamon malipoense* from Vietnam; **B.** Mud burrows of *S. malipoense*; **C, D.** Habitat landscape of *S. malipoense* in Khau Vai Commune, Meo Vac District, Ha Giang Province, Vietnam.

terminal article short, slender, subconical, relatively less strongly bent at about 30° angle outwards, about 0.4 times length of subterminal article, with distinct groove for G2 on ventral side, tip subtruncate, recurved upwards (Fig. 14; cf. Shi et al. 2023: fig. 9D, E); G2 longer than G1; terminal article relatively short; subterminal article about 3.0 times length of terminal article (Fig. 14; cf. Shi et al. 2023: fig. 9D); female pleon ovate, covering most of thoracic sternum (Fig. 13C; cf. Shi et al. 2023: fig. 8F); vulvae transversely ovate, closely located to each other, touching suture of thoracic sternites 5 and 6, opened inwards (Fig. 13D; cf. Shi et al. 2023: fig. 8H).

Geographically, the Chinese and Vietnamese populations are separated by about 70 km (Fig. 15) of lowlands. The area where the Vietnamese specimens were collected is part of a larger karst landscape known as the Dong Van Karst Plateau, which itself is a contiguous extension of the South China karst belt (Yunnan karst plateau) (Tran et al. 2022) where the type locality of *S. malipoense* Shi, Pan & Sun, 2023, is located.

Discussion

The freshwater crab faunas of northern Vietnam and southwestern China share multiple genera and species, indicating a close biogeographic relationship (Pan et al. 2022b). Several genera and species found in China are also recorded in northern Vietnam, including *Aiyunamon* Pan, Ng & Sun, 2022 (Pan el al. 2022a; cf. Ng and Ngo 2023); *Chinapotamon* (in Le et al. 2024, current study); *Hainanpotamon* Dai, 1995 (in Yeo and Naruse 2008); *Indochinamon jinpingense* (Dai, 1995) (in Yeo & Ng, 1998); *Indochinamon malipoense* Zhang and Sun in Zhang, Pan, Hao & Sun, 2020 (Zhang et al. 2020; cf. Dang et al. 2024); *Lacunipotamon* Dai, Song, He, Cao, Xu & Zhong, 1975 (Dai et al. 1975; cf. Ng et al. 2023); *Tiwaripotamon pluviosum* Do, Shih & Huang, 2016; and *Tortomon* Huang, Wang & Shih, 2020 (Huang et al. 2020; cf. Ng and Ngo 2023). The discovery of a new species of *Chinapotamon* and the new distribution records of *C. pusillum* and *S. malipoense* from northern Vietnam further support this close biogeographic interpretation. Earlier studies have suggested that Yunnan and Guangxi Provinces in southern China that border Vietnam are hotspots for potamid freshwater crab diversity (Pan et al. 2022b). It is likely that more southern Chinese species or close relatives are still undocumented from the border regions of northern Vietnam. Our study highlights the need for continued research to better understand the crustacean biodiversity of this region, especially for the border regions of northern Vietnam, which is still poorly explored and surveyed.

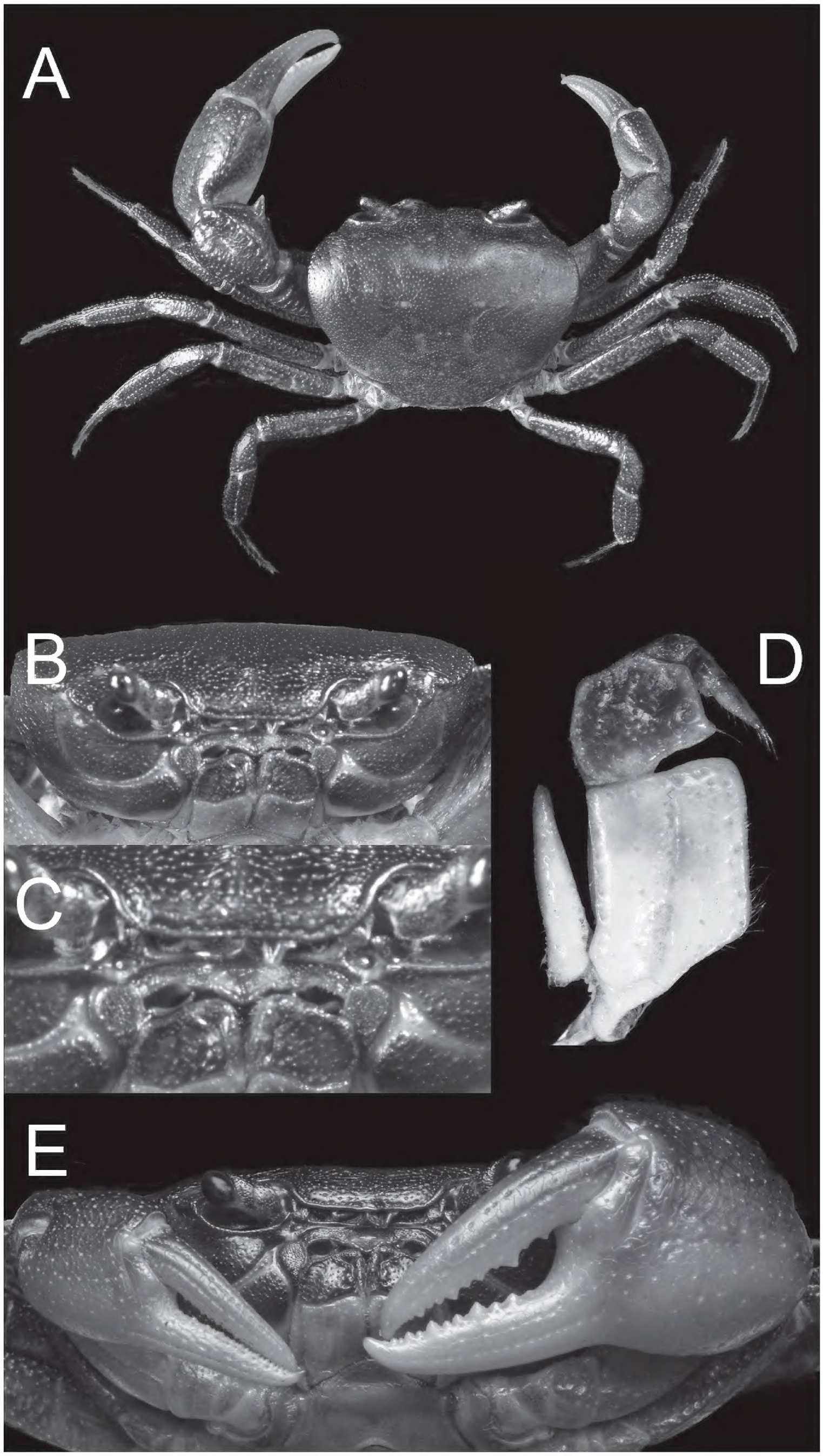

Figure 12. *Songpotamon malipoense* Shi, Pan & Sun, 2023, Vietnam. Male, (18.9 × 14.7 mm) (IB-FC-SMx01). **A.** Overall dorsal habitus; **B.** Frontal view of cephalothorax; **C.** Antennae, antennules and epistome; **D.** Right third maxilliped; **E.** Chelipeds (lateral view).

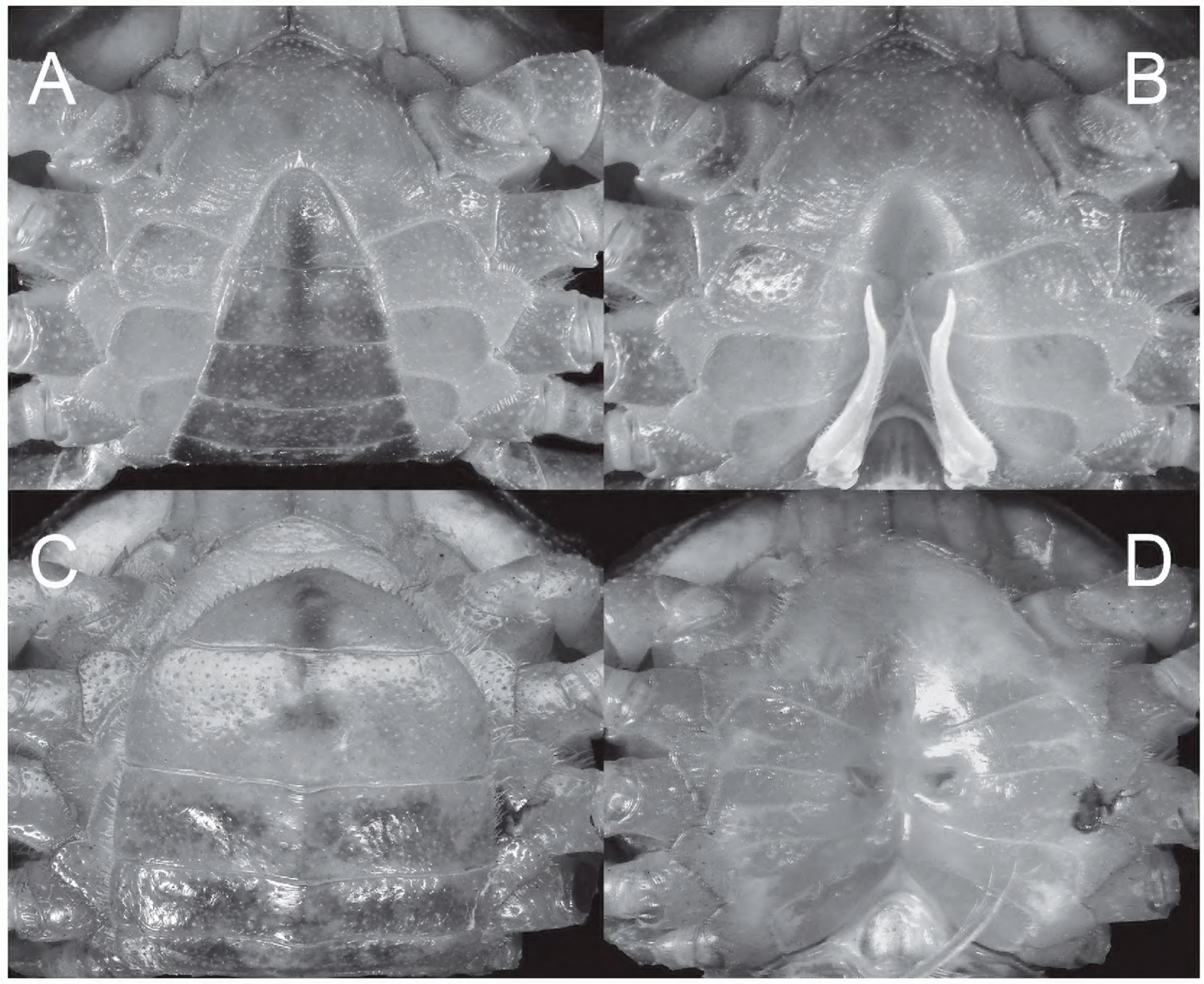

Figure 13. *Songpotamon malipoense* Shi, Pan & Sun, 2023, Vietnam. **A, B.** Male, (18.9 × 14.7 mm) (IB-FC-SMx01); **C, D.** Female, (15.3 × 12.4 mm) (IB-FC-SMx01). **A, C.** Ventral view, with pleon closed; **B.** Sternopleonal cavity with right G1 in situ; **D.** Sternopleonal cavity and vulvae.

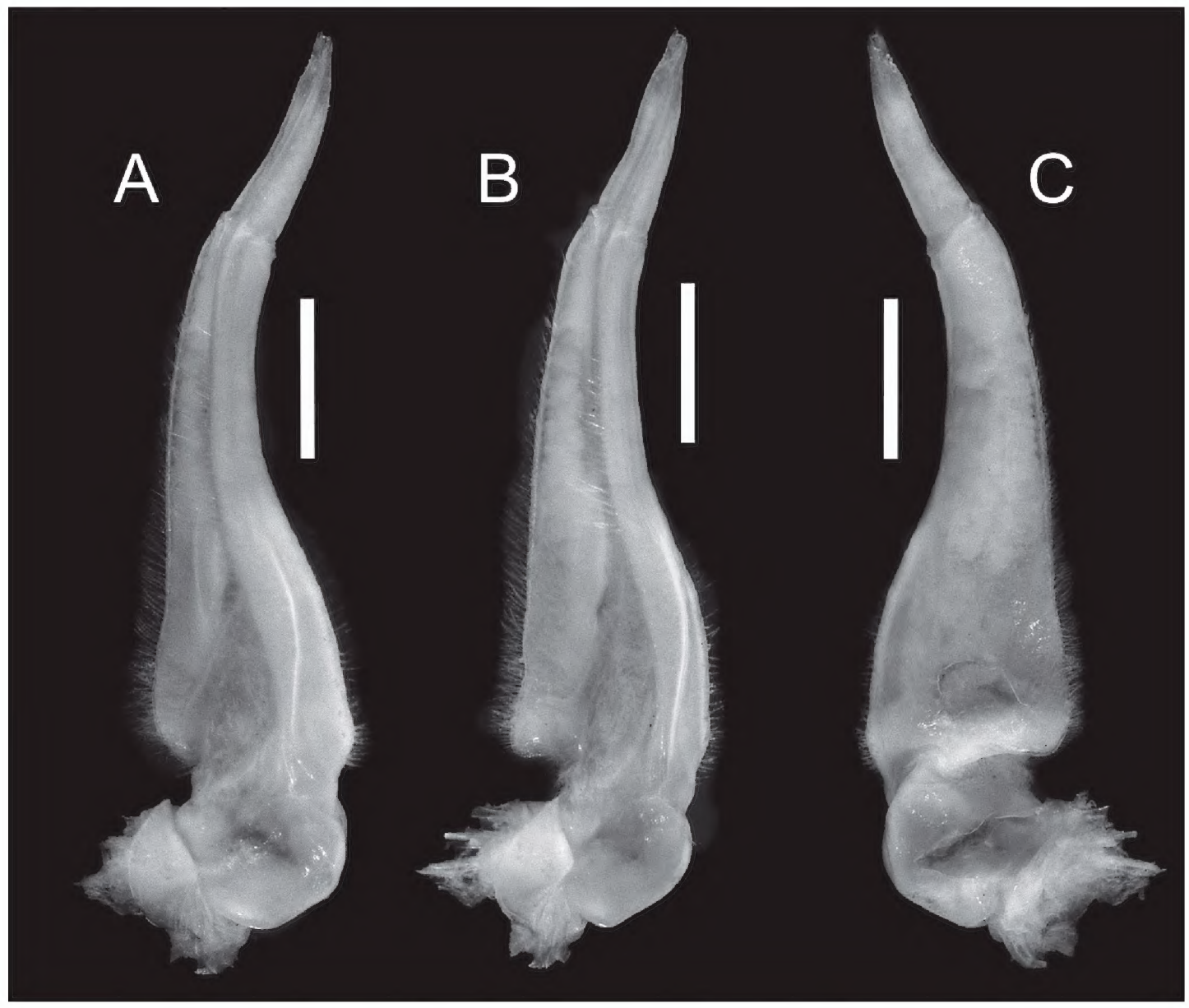

Figure 14. *Songpotamon malipoense* Shi, Pan & Sun, 2023, Vietnam. Male, (21.8 × 16.3 mm) (ZRC 2024.0321), Left G1, **A**. Ventral view; **B.** Oblique ventral view; **C.** Dorsal view. Scale bar: 1 mm.

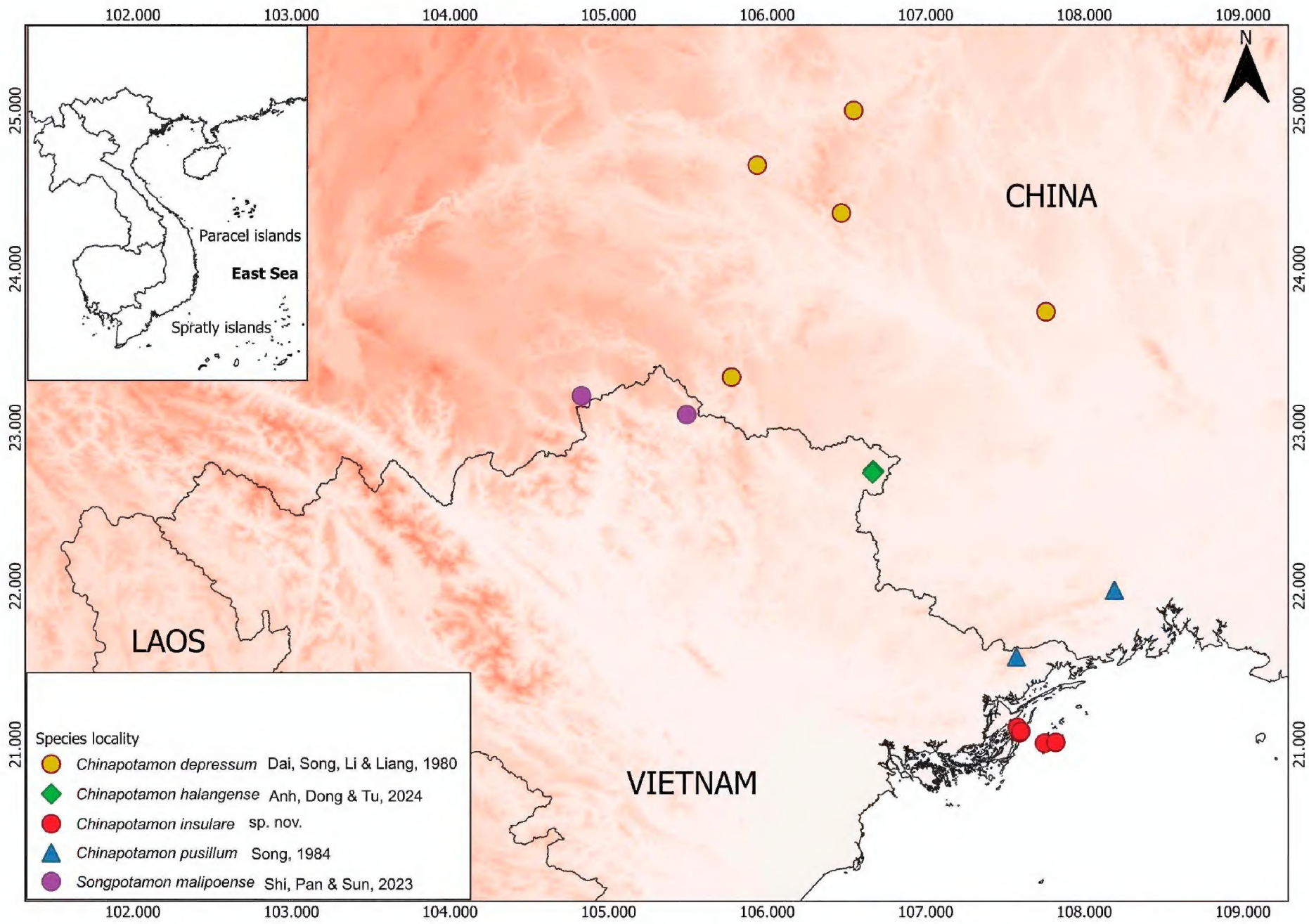

Figure 15. Map showing the distribution of *Chinapotamon depressum*, *C. pusillum*, *C. insulare*, *C. halangense* sp. nov., and *Songpotamon malipoense* in Vietnam and China.

The three species of freshwater crabs discussed in this study are restricted to mountainous areas along the border between Vietnam and China and are highly vulnerable to habitat degradation. One species was found within a protected forest, but most of the surrounding habitat has been converted into agricultural land with rice, maize and cassava as the dominant crops. Additional threats include the use of agrochemicals (e.g., herbicides and pesticides), soil erosion leading to stream sedimentation, and occasional harvesting by local communities. To safeguard the long-term survival of these species, conservation efforts should focus on protecting and restoring the remaining forest patches, maintaining clean and stable freshwater sources, and promoting environmentally friendly agricultural and forestry practices.

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References

Cumberlidge N, Ng PKL, Yeo DCJ, Naruse T, Meyer KS, Esser LJ (2011) Diversity, endemism and conservation of the freshwater crabs of China (Brachyura: Potamidae and Gecarcinucidae). Integrative Zoology 6(1): 45–55. https://doi.org/10.1111/j.1749-4877.2010.00228.x

Dai AY (1995) Five new species of freshwater crabs of genus *Potamon* from Yunnan Province, China (Crustacea: Decapoda: Potamidae. Journal of Taiwan Museum 48(1): 49–59.

Dai AY (1999) Fauna Sinica (Arthropoda. Malacostraca. Decapoda. Parathelphusidae. Potamidae). Science Press, Beijing, 501 pp.

Dai AY, Naiyanetr P (1994) A revision of the genus *Tiwaripotamon* Bott, 1970, the freshwater crabs from China (Decapoda: Brachyura: Potamidae. Sinozoologia 11: 47–72.

Dai AY, Song YZ, He LY, Cao WJ, Xu ZB, Zhong WL (1975) Description of several new species of freshwater crabs from China that are intermediate hosts of lung flukes. Zoologica Sinica 21(3): 257–264. [In Chinese]

Dai AY, Song YZ, Li LL, Liang PX (1980) New species and new record of freshwater crabs from Guangxi. Dong Wu Fen Lei Xue Bao 5(4): 369–376.

Dang K, Hoang AT, Do C (2024) A new species of the genus *Indochinamon* Yeo & Ng, 2007 (Crustacea: Brachyura: Potamoidea: Potamidae) and a new country record from Northern Vietnam. Zootaxa 5437(4): 560–570. https://doi.org/10.11646/zootaxa.5437.4.8

Davie PJF, Guinot D, Ng PKL (2015) Anatomy and functional morphology of Brachyura. In: Castro P, Davie PJF, Guinot D, Schram F, Vaupel Klein C (Eds) Treatise on Zoology – Anatomy, taxonomy, biology - The Crustacea, Complementary to the volumes translated from the French of the Traité de Zoologie. 9C(I). https://doi.org/10.1163/9789004190832_004

Do VT, Shih HT, Huang C (2016) A new species of freshwater crab *Tiwaripotamon* Bott, 1970 (Crustacea, Brachyura, Potamidae) from northern Vietnam and southern China. The Raffles Bulletin of Zoology 64: 213–219.

Hu R, Lai K, Luo B, Tang R, Huang R, Ye X (2023) The medicinal plant used in the Guangxi Fangcheng Golden Camellias national nature reserve, a coastal region in southern China. Journal of Ethnobiology and Ethnomedicine 19(1): 32. https://doi.org/10.1186/s13002-023-00605-4

Huang C, Wang J, Shih HT (2020) A new genus and two new species of freshwater crab (Crustacea: Brachyura: Potamidae) with unusualcoiled tip of male second gonopods from Yunnan, Southwestern China. Zoological Studies 59: 1–11.

Le HA, Dang VD, Do VT (2024) First record of the genus *Chinapotamon* Dai & Naiyanetr, 1994 (Crustacea: Decapoda: Brachyura: Potamidae) from northern Vietnam with description of one new species. Zootaxa 5424(5): 501–519. https://doi.org/10.11646/zootaxa.5424.5.1

Naruse T, Chia JE, Zhou X (2018) Biodiversity surveys reveal eight new species of freshwater crabs (Decapoda: Brachyura: Potamidae) from Yunnan Province, China. PeerJ 6: e5497. https://doi.org/10.7717/peerj.5497

Ng PKL (1988) The freshwater crabs of peninsular Malaysia and Singapore. Department of Zoology, University of Singapore, Shinglee Press, Singapore, 156 pp.

Ng PKL (2017) Descriptions of two new cavernicolous species of *Chinapotamon* Dai & Naiyanetr, 1994 (Crustacea: Brachyura: Potamidae) from China. Crustacean Research 46: 1–16. https://doi.org/10.18353/crustacea.46.0_1

Ng PKL, Ngo VT (2023) Two new species of semiaquatic freshwater crabs of the genera *Tortomon* and *Aiyunamon* from karst forests in northern Vietnam (Crustacea: Brachyura: Potamidae). Zootaxa 5284(2): 364–376. https://doi.org/10.11646/zootaxa.5284.2.8

Ng PKL, Guinot D, Davie PJF (2008) Systema Brachyurorum: Part I. An annotated checklist of extant brachyuran crabs of the world. The Raffles Bulletin of Zoology. Supplement 17: 1–286.

Ng PKL, Tan ZW, Ngo VT (2023) Revision of the genus *Lacunipotamon* Dai, Song, He, Cao, Xu & Zhong, 1975 (Crustacea: Decapoda: Brachyura: Potamidae), with descriptions of eight new species from Vietnam. Zoological Studies (Taipei, Taiwan) 62: e20.

Pan D, Ng PKL, Sun HY (2022a) *Aiyunamon*, a new genus for southern Chinese potamid species previously placed in *Eosamon* Yeo & Ng, 2007 (Decapoda: Brachyura: Potamidae). The Raffles Bulletin of Zoology 70: 320–328. https://doi.org/10.26107/RBZ-2022-0016

Pan D, Shi BY, Du SY, Gu TY, Wang RX, Xing YH, Zhang Z, Chen JJ, Cumberlidge N, Sun HY (2022b) Mitogenome phylogeny reveals Indochina Peninsula origin and spatiotemporal diversification of freshwater crabs (Potamidae: Potamiscinae) in China. Cladistics: The International Journal of the Willi Hennig Society 38(1): 1–12. https://doi.org/10.1111/cla.12475

Shi BY, Pan D, Sun HY (2023) A taxonomic revision of the freshwater crab genus *Parvuspotamon* Dai & Bo, 1994 (Decapoda, Brachyura, Potamidae), with descriptions of a new genus and two new species. ZooKeys 1183: 13–38. https://doi.org/10.3897/zookeys.1183.109948

Shih HT, Ng PKL (2011) Diversity and biogeography of freshwater crabs (Crustacea: Brachyura: Potamidae, Gecarcinucidae) from east Asia. Systematics and Biodiversity 9(1): 1–6. https://doi.org/10.1080/14772000.2011.554457

Song YZ (1984) A new species of *Tiwaripotamon* from China (Decapoda: Potamidae). Dong Wu Fen Lei Xue Bao 9(2): 143–145.

Tran DA, Goeppert N, Palmer AN, Goldscheider N (2022) Development and structure of karstification of the Dong Van Karst Plateau UNESCO Global Geopark, North Vietnam based on cave survey data. International Journal of Earth Sciences 111(5): 1573–1592. https://doi.org/10.1007/s00531-022-02190-5

Yeo DCJ, Naruse T (2008) A revision of the freshwater crab genus *Hainanpotamon* Dai, 1995 (Crustacea: Decapoda: Brachyura: Potamidae: Potamiscinae), with a redescription of *Potamon* (*Potamon*) *orientale* (Parisi, 1916) and descriptions of three new species. Zoological Science 24(11): 1143–1158. https://doi.org/10.2108/zsj.24.1143

Yeo DCJ, Ng PKL (1998) Freshwater crabs of the *Potamon tannanti* species group (Crustacea: Decapoda: Brachyura: Potamidae) from northern Indochina. The Raffles Bulletin of Zoology 46(2): 627–650.

Zhang Z, Pan D, Hao X, Sun H (2020) Two new species of freshwater crabs of the genera *Eosamon* Yeo & Ng, 2007 and *Indochinamon* Yeo & Ng, 2007 (Crustacea, Brachyura, Potamidae) from southern Yunnan, China. ZooKeys 980: 1–21. https://doi.org/10.3897/zookeys.980.52186

Zou JX, Bai J, Zhou XM (2018) A new species of karst-dwelling freshwater crab of the genus *Chinapotamon* Dai & Naiyanetr, 1994 (Crustacea: Decapoda: Brachyura: Potamidae), from Guizhou, southwest China. PeerJ 6: e5947. https://doi.org/10.7717/peerj.5947